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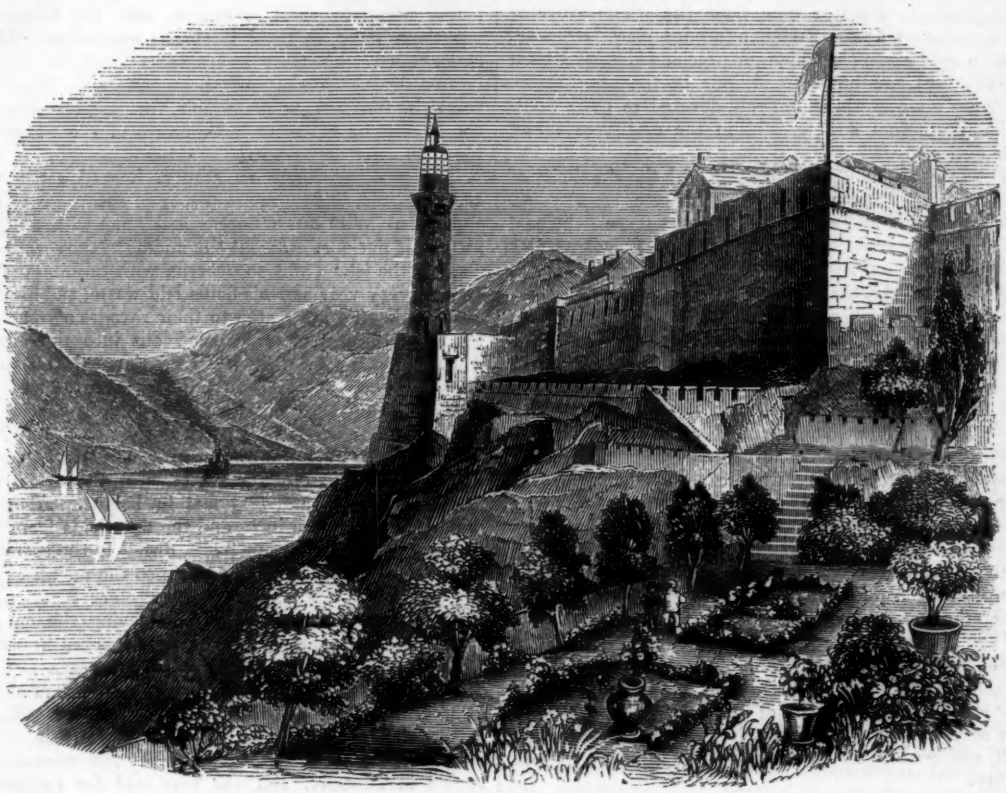
THE ISLAND OF ELBA.



THE CASTLE OF PORTO LONGONE.

ELBA, the Ilna or Ilva of the Etruscans and Romans, and called Æthalia by Strabo, is an island in the Mediterranean sea, near the coast of Tuscany, and separated from it by the narrow channel of Piombino. Its shape is very irregular; its length is about eighteen miles, and its greatest breadth, which is on its east side, is about ten miles; in its west part it is six miles broad, and towards the middle of its length it is only three, in consequence of the coast being indented by gulfs both from the north and south. The prevailing rocks seem to be granite, claystone, and limestone passing into marble; but near the coast, being continually triturated and battered by the winds, and by currents, and surges of a sea often tempestuous, the shores present numerous sharp angles, encroaching upon the land, or jutting out into the water, of which the number and shape vary continually.

The area of the island is about 154 square miles: it is very mountainous; the highest summit, Monte della Capanna, in the west, is 3600 feet above the level of the sea.

In ancient times Elba seems to have been populous. Virgil, in the *Æneid*, states that it contributed 300 chosen soldiers to Æneas, in his wars with Turnus. Silius Italicus states that, after the unfortunate day of Trebia, it sent (the same number with Sicily) 3000 excellent archers, armed and equipped, and a vast quantity of arms, to the Roman consuls.

In the year 1778, the number of inhabitants scarcely amounted to 8000: in 1808 it was nearly 12,000, and it is now estimated at about 13,500, of which Porto Ferrajo, the capital, has about 3000. Porto Ferrajo lies on the north coast of the island: it has an excellent harbour, and is strongly fortified with two citadels on the hill above it, between which is the palace formerly inhabited by Napoleon. It is a plain house, of two stories, with wings. It commands, towards the south, a fine view of the town, harbour, and mountains; and, in the north of Piombino, the coast of Italy, as far as the mountains of Lucca, and the islands to the west. Not a boat can stir without being observed. The whole of this ridge, which is a rocky promontory or peninsula, projecting into the bay, is quite destitute of foliage. The rock, the houses, the bastions, and the flanking walls of the fortifications, being all white, are distressing to the eyes; and the heat in summer would be almost insupportable, did not the sea-breeze temper and freshen the air. The town has two parish churches, one hospital, and a lazaretto. A good road, five miles in length, made by Napoleon, leads from this town to Porto Longone, on the east coast, on a deep bay, where there is good anchorage for vessels. The castle of Porto Longone is on a steep hill, and is regularly fortified. The town is small, and numbers about 1000 inhabitants. The other principal towns or villages in the island are Rio, Marciana, Campo, and Capo Liveri.

The Elboise are attached to their native soil, and by choice, as well as by necessity, lead a life of labour. Like the early Romans, they pass with equal pleasure and eagerness from the cultivation of the earth to the toils of the camp. They have often repulsed the barbarians, who sought to invade their country or reap their harvests. Every man is born a seaman, and the inability to row and navigate a boat is thought disgraceful: they are passionately addicted to the chase, and are fond of all manly exercises. Their hair is generally black, the complexion brown, the countenance lively, and the eye penetrating. A hat of black straw, a white boddice, a short petticoat of red or blue, form the whole attire of the women;—a flower, a ribbon, a huge ring, large earrings, a gold chain (in which the precious metal is almost lost in alloy), are holiday additions to the usual dress. They are good mothers, entirely devoted to their families, and punctual and faithful in the discharge of all their duties.

The food of the Elboise accords with the simplicity of their habits. Their cheese, procured from ewes' milk, is of a bad taste and smell, but the curds are delicious, and form a principal item in their food. They have also good bacon, salted and smoked provisions, coarse bread, fresh fish, chiefly the tunny, and very few vegetables. They eat vast numbers of chestnuts, of which the crop is gathered towards the end of October: they are dried by the fire till the double rind peels off, then ground in a corn-mill with the upper grindstone raised to accommodate their bulk: the flour produced is not mixed with bran; it is soft, saccharine, and of a yellowish-gray colour, approaching nearer to white in proportion as the chestnuts have been carefully picked and dried. The flour thus formed combines and hardens when squeezed together. To preserve it it must be kept in a dry place, compressed with considerable force, and covered to a depth of two or three inches with ashes or sand. The Elboise make from it pollenta and pastry, far superior to any that can be procured from maize.

They are very sparing in their food: they breakfast on pollenta: at noon they dine off bread, beans, lentils, or other species of pulse, boiled and seasoned with oil; their evening meal consists of soup and fish. On holidays only do they allow themselves the luxury of fresh meat, and a white wine, carefully made, and of excellent quality.

Their houses are of small elevation, but the interior is neat, the furniture simple and solid. The kitchen utensils are all formed of baked earth, imported from Naples and Tuscany. Their beds are remarkable for their enormous size, each one being sufficient for the repose of a whole family of eight, ten, or twelve persons.

Dancing is one of their favourite amusements, but it is said to want that expression of sentiment, that vivacity of movement, and variety of attitude, so pleasingly shown by the peasantry of Rome, Naples, Tarentum, and Calabria. Even in the time of harvest there is little gaiety; the corn is thrashed out under a burning sun, and in the evening there is not heard, as on the plains of Tuscany, the violin or the mandoline, announcing that the toils of the day are at an end, and that every heart is happy: the pleasures of the table do not here cause the neighbourhood to resound with the joyous shouts of the labourer. The period of the vintage is the carnival of the cultivators of the vine: mirth is then most obstreporous, and, while the grapes are gathered, echo is taught to repeat the loud notes of musical instruments.

The Elboise language is a patois, of which the radical words are in the Tuscan dialect: it is easy of pronunciation and by no means disagreeable. The amusement in which the people take greatest delight is that of the improvisatore, or recitations in verse upon any given subject, on days of festivity. In common with the improvisatore songs of Italy, an attentive observer may recognise entire passages from Tasso, Ariosto, Metastasio, &c., which the extemporaneous poet has adroitly adapted to his own subject.

From the naked mountainous character of the island there is but little arable or pasture land; but the lower ridges, the valleys, and little plains are planted with the vine, olive, mulberry, and other fruit-trees. the island also produces some wheat and maize, vegetables and water-melons. There is a sad deficiency of timber: from the practice of burning for pasture, the wood and shrub upon the hills are in general small, except where the cork-tree abounds. The rest consists of ever-green oak, arbutus, myrtle, and heath. Aromatic herbs and plants occur in great profusion, and the inhabitants use them daily in their kitchens; everywhere the air is perfumed with their sweet scents, and the eye delighted by the variety of their flowers. Few places would be found more favourable for keeping bees, but the Elboise do not seem to be aware of the advantages likely to arise therefrom.

The pastures being so scanty, horned cattle is of course scarce, but there are plenty of sheep, goats, pigs, and asses. Wild cats are occasionally met with, and their history is curious. About the middle of the seventeenth century the island was so overrun with rabbits that the farmer every year saw his fields laid waste, and his hopes destroyed. To put a stop to their ravages a great number of cats in kitten were turned out into the districts which were most infested. They pursued the rabbits into their very burrows, in a few years reduced their numbers, and have ever since kept them in check.

The iron ore of Elba is particularly rich. It is found in a mountain near Rio on the east coast, and consists almost entirely of one mass of ore, about two miles in circumference, and 500 feet in height. About 200 miners are employed in it, and the ore yields from 50 to 75 per cent. of pure metal; but, owing to the scarcity of fuel, the ore is embarked and taken to the mainland to be smelted, as it was when Strabo wrote. Sixty carriers with 100 asses are employed in conveying the ore from the mines to the shores, where it is embarked in boats of from 5 to 30 tons. For a period of ten years, *i.e.*, from 1825 to 1834, the quantity of ore produced annually was 1600 centi. The cento is an ancient measure still used in the island, consisting of 33,333⅓ Tuscan lbs., or 25,000 English lbs. Of this quantity 700 centi are consumed in Tuscany, and the rest sold for exportation, principally to Genoa, Rome, Naples, and Corsica.

The other mineral productions of Elba are loadstone, alum, vitriol, and various kinds of marble. The salt-pans on the sea-shore produce annually about 50,000 cwts. of salt.

We will conclude this notice with a brief sketch of the history of the island. Elba is supposed to have been first peopled by a colony of Etruscans, and afterwards occupied by a body of Greeks, who founded Marseilles. It subsequently fell under the dominion of Carthage, and was taken by the Romans during the first Punic War. In the second Punic War Elba supplied iron for naval and military purposes, and was considered as one of the states which had saved the republic. In the contest between Sylla and Marius the adherents of the latter fled thither for refuge, and Elba became thus involved in proscription and devastation, from the effects of which it never recovered under Roman dominion. In modern times it became attached to the commercial republic of Pisa; under the auspices of which it attained a comparatively flourishing condition. On the annexation of Pisa to Milan, Elba, with Pianosa, Monte Cristo, Piombino, and other territories, was formed into a little principality, which continued for about two centuries in the hands of Gherando d'Assiano and his successors, though repeatedly occupied as a military station by Charles V. and his ally the Grand Duke of Tuscany. Being thus involved in the wars of that monarch with the Porte and the Barbary States, Elba became exposed to the incur-

sions of the Turkish corsairs. It was laid waste with fire and sword once by Barbarossa, and twice by Dragut, and it was long ere it recovered from these ravages. Under Philip III. it fell into the possession of Spain, and that prince ordered the construction of Porto Longo, which proved a barrier against the incursions of the corsairs. Several transferences afterwards took place, the result of which was that, after 1735, the King of Naples had possession of Porto Longone, and the Grand Duke of Tuscany of Porto Ferrajo. Elba continued in this state till the French Revolution, when it first became part of the kingdom of Etruria, and was then annexed to France.

In modern times Elba has become an object of great interest in consequence of its having been the residence of an individual who had been unceasingly present to the hopes and fears of almost every man in Europe during by far the most eventful period of its history. On the first abdication of Napoleon in April, 1814, the Emperor Alexander proposed that he should retain the title of Emperor, with the sovereignty of the island of Elba, and a revenue of six millions of francs, to be paid by France. This was agreed to by Prussia, Austria, and afterwards by England. On the 20th of April Napoleon left Fontainbleau, and proceeded to Frejus, where he embarked on board the British frigate, the Undaunted, and on the 4th of May landed at Porto Ferrajo. He was at first extremely unpopular. The visitations of the French had left lasting memorials among the suffering inhabitants, but his tact and liberality soon produced a change. In less than three weeks he had explored every corner of the island, and projected more improvements of all sorts than would have occupied a long life to complete. He even extended his empire by sending some dozen or two of his soldiers to take possession of a small adjacent islet, hitherto left unoccupied for fear of corsairs. He established four different residences at different corners of his little island, and was continually in motion from one to another of them. Alterations and improvements went on everywhere: in a few weeks a building was erected for the evening's amusement of the Elboise; a spacious barrack constructed; an easy carriage-road was made into the town by the best level towards the opposite extremities of the island, and others were levelled. Five thousand men were constantly employed, at six pauls, or about three shillings, a day, in these various undertakings, and the peasants witnessed suddenly the effects of improvements which till then they had scarcely imagined. His presence gave a new stimulus to the trade and industry of the islanders; the port of Ferrajo was crowded with vessels from the opposite coasts of Italy; and such was still the power of his name, that the new flag of Elba (covered with Napoleon's *bees*) traversed with impunity those seas most infested with the Moorish pirates.

For some time Napoleon seemed reconciled to his lot, but after a few months he became more reserved and gloomy, and was frequently absent and lost in thought: he was in fact engaged in secret correspondence with his friends in France and Italy; a wide conspiracy was formed, and on the 26th of February, 1815, he embarked, with about 1000 men of his old guards who had followed him to Elba, and landed on the 1st of March at Cannes. It does not belong to our subject to follow him further. On the second downfall of Napoleon, Elba was ceded to the Grand Duke of Tuscany.

The princess, afterwards Queen Elizabeth, on sending her portrait to her half-brother King Edward the Sixth observed, —"For the face, I grant, I might well blush to offer; but the mind, I shall never be ashamed to present. For though from the grace of the picture the colours may fade by time, may give by weather, may be spotted by chance, yet the other, nor time with her swift wings shall overtake, nor the misty clouds with their lowerings may darken, nor chance with her slippery foot may overthrow."

ON SPRINGS, WELLS, AND FOUNTAINS.

II.

In our former article on this subject we offered to the notice of the reader a few details on springs and fountains, and stated that the ancient Romans seemed to be well aware of the principle upon which artificial fountains are produced. The accompanying cut represents a fountain discovered during the excavations at Pompeii, at the east end of the court of the Fullonica. Sir William Gell speaks of it as "one of the prettiest things of the kind yet discovered, and showing that the ancients had the art of constructing fountains in jets as we now possess it." We now propose to speak of wells, respecting which there are many curious details worthy of notice.

Mr. Mylne, the engineer of the New River Company, communicated many of the results of his experience to the Institute of Civil Engineers, in whose *Transactions* they were published a few years ago.

In this paper it is mentioned, that a well, which was formerly dry, at Coutts's banking-house, afterwards yielded so plentifully that the water flowed over the top of the well, and thence found its way to the Thames; but other wells having been sunk in the neighbourhood this one is so influenced that the level of the water does not now rise higher than low-water mark. A well at Norland House, Kensington, which at one time flowed over, is now sunk several feet, from a similar cause. Other wells, situated at Tottenham, Tooting, Mitcham, and Hanwell, have all been affected in a similar manner, and from similar causes. Barclay's brewery, being situated in Southwark, near the south bank of the river, and Calvert's brewery, being situated in Thames-street, near the north bank, it is found that when Barclay's pump is worked, the level of the water at Calvert's pump is perceptibly affected, thus proving the singular fact that the watery stratum passes under the Thames, just as it would do under dry land, without seeming to be in connexion with the Thames water. Other breweries, at which a large quantity of water is required, are affected by similar inconveniences. In a well at Whitbread's, in Chiswell-street, the supply of water was found to be so affected by the sinking of other wells in the neighbourhood, that it had to be deepened to a very great extent. At Combe and Delafield's, in Castle-street, Long Acre, the well having been affected by similar causes, it was deepened, and by so doing, a well at some saw mills, in St. Martin's-lane, was rendered almost useless. A well, sunk at the New River Company's reservoir, in the Hampstead-road, has been found to be sensibly affected whenever the well at the Zoological Gardens, in the Regent's Park, is being worked. Numerous similar instances have been adduced, all pointing clearly to the fact that the water stratum, beneath the clay, is continuous to a great extent.

Another inconvenience alluded to results from the removal of the sand along with the water. The underlying sand is of so fine a nature that it will pass through very minute apertures, and is easily put in motion, whence it follows that the sand is drawn up in considerable quantities with the water, often tending to choke the pipe through which it ascends, and to cut the pump-barrels, by reason of the sharpness of the granules. The most serious effect, however, is, that by the withdrawal of so large a quantity of sand, a vacant cavity is formed beneath the clay, which, being thus left partially unsupported, has a tendency to sink, and to endanger the buildings above. Among the instances of this kind adduced by Mr. Mylne, is that of a well at Messrs. Reid's brewery, Liquorpond-street, where the withdrawal of sand caused such a cavity to be produced that the working of the pump had to be stopped, to prevent danger to the buildings. Similar effects, varied in degree, are said to have occurred at the vinegar works in the City-road, and at three or four other large establishments in the Metropolis.

When these circumstances became known to engineers a subject of inquiry arose, how far the chalk beneath the clay was likely to furnish a supply of water. It is known that many fissures and hollows exist in the upper chalk formation; and if these be filled with water, which can be obtained by boring down through the chalk, one at least of the two inconveniences just mentioned would be obviated. On the existence of water in the London chalk basin, and on the probable mode in which it entered, Mr. Simpson thus remarks:—

From examples of wells bored and sunk in and near the Metropolis, particularly on the western side, viz, Hammersmith, Fulham, &c., the springs in the chalk formation are evidently more abundant, and in most instances rise much higher, than the springs from the sand stratum above it: nearly all the overflowing wells near London derive their supply from the chalk formation. The water in most cases is found at about seventy feet depth in it, sometimes in strata of loose flints, sometimes in fissures, and occasionally in soft veins in the chalk. Sufficient proof of this has been obtained by borings in and near the Metropolis, and by connecting the observations with the cases of wells actually sunk into the chalk immediately outside the London basin. The fact of the water rising to higher levels may be attributed to the more open structure of the formation compared with the sand strata; but it is more probably attributable to the sources from whence the supplies are derived being in more elevated situations; and there seems already sufficient evidence to connect a considerable portion, if not the whole, of the source of the supply, with the rivers and streams traversing the bassetts of the strata, where they crop out and intermingle with the chalk in the uplands near the Metropolis.

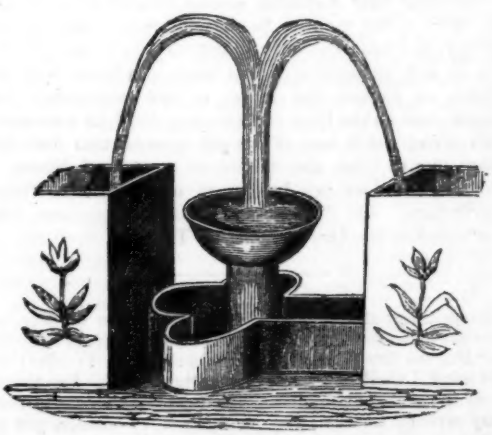
It is the opinion of this gentleman, that the custom of seeking for water in the chalk stratum, rather than in the strata superposed in it, will hereafter become very prevalent in the sinking or boring of wells.

The practical operations of the well-digger are attended with the most diversified results, showing that although certain broad principles may be detected, yet the operation of these in any particular spot can scarcely be predetermined. It is said that a well has been sunk near Wimbledon to a depth of more than five hundred feet without water being found. A well was bored near Bermondsey Church to a depth of eighty feet, when the boring instrument suddenly sank fifteen feet, as if into a cavity filled with water; after several tons of green mud were pumped up, the water rose in a clear state, and has since that been accustomed to rise and fall three feet with the tide, showing some connexion between it and the river. At the vitriol-works at Deptford, a boring of 210 feet caused the water to rise to within nine feet of the top. At the Excise-office in Broad Street, the water in a well 160 feet deep, rose no higher than within sixty feet of the top. The neighbourhood of Wandsworth seems particularly fortunate in the nature of its springs. Mr. Mylne says that at the copper-works at Wandsworth there is a large boring, from which the water rushes out to the height of about twenty feet above the ground; for convenience it has been confined by a bent tube, so as to deliver the water horizontally into a mill-head. Several others occur along the banks of the river Wandle, all delivering above the ground surface, and so plentifully that they give considerable power to the mills in that river. Mr. Phillips some years ago mentioned a curious circumstance respecting a well sunk at Epping. The well was first dug in the usual way to a depth of 200 feet, without reaching water. A boring was then commenced to an additional depth of 220 feet, until the sand beneath the clay was reached. No water appeared, and the mouth of the well was closed up; but when it was opened, five months afterwards, a supply of limpid and soft water was found to have risen in it to within twenty-six feet of the surface.

In these observations the reader may have remarked that we have sometimes spoken of *digging*, or *sinking* a well, and at other times of *boring* it. The difference between these operations requires a little explanation. A well, as we generally understand the term, is a cylindrical hole, dug in the earth, with a diameter of four or five feet, by means of pickaxes and shovels, and lined with brickwork, to prevent the earth from falling in. From the well thus made the water—if it does not reach the surface—is drawn by one of two methods, either by means of a bucket attached to a rope winding round a windlass at the top, or by means of a pump acting on the ordinary principles of suction or atmospheric pressure. But when the depth becomes very great before water is reached, or when the strata excavated are very hard, the process of digging becomes very laborious and costly. To obviate the necessity of digging under such circumstances, a plan has been devised for boring a hole only three or four inches in diameter, instead of making an excavation of several feet. A well so constructed is called an *artesian well*, from the province of Artois, in France, where the plan is said to have been first adopted*.

The locality having been chosen, the borers usually dig a pit, a few feet in diameter, to serve as the top of the well, and in the earthen floor of this pit they bore the well-hole. The boring-tools are chisels and augers of various shapes. A chisel, with a long cross handle, is first used to penetrate the ground; if the soil be soft, the weight of two men pressing on the handle, and occasionally turning it round, will be sufficient to make the chisel sink; but if the ground be hard, the progress of the chisel is urged by repeated blows at the upper end. When a hole is thus formed to a certain depth, the loose earth is removed by a kind of auger, furnished with a valve; and a regular process of boring then commences. The chisel is lengthened by an iron rod being inserted between it and the handle; and this lengthened chisel is worked until the hole is bored as far as the instrument will reach. The chisel is then taken out, and removed from the handle; a valved auger is fixed in its place, with which the loosened earth or stone is removed. The auger is next removed, another length of iron rod is added, the chisel attached as before, and the hole further bored to a depth equal to the additional length of the instrument. Thus the operations proceed, the excavating instrument being lengthened six or seven feet at a time, until a watery stratum is reached. Sometimes the workmen bore the full width of the hole at once, but at other times they use a small chisel first, and then expand the hole to four inches' diameter, by means of a larger instrument. A metallic pipe, a little smaller than the hole, is subsequently inserted in it, for a considerable portion of its depth, to prevent the hole being choked by the surrounding soil, and also to prevent the entrance of impure water, draining from the vegetable mould in its vicinity.

* See *Saturday Magazine*, Vol. XV. p. 190



FOUNTAIN OF THE FULLONICA AT POMPEII.

JAVANESE SKETCHES. III.

FIRE PHEASANT OF JAVA.

Sketch of the Natural Productions of Java.

Java is distinguished by the abundance and extraordinary variety of its vegetation. Between the tops of the mountains and the sea-shore, this island may be considered to possess at least "six distinct climates, each furnishing a copious indigenous botany, while the productions of every region in the world may find a congenial spot somewhere in the island."

There are upwards of a hundred varieties of rice, which is the staple grain of the country: it is cultivated on the slopes of mountains and the low fields, and gives a return of thirty, forty, or fifty fold. The bamboo, the cocoa-nut tree, the sugar cane, the cotton tree and the coffee plant flourish in the greatest luxuriance; while maize, or even wheat and rye, potatoes and the other plants of Europe, are cultivated to advantage on high and inland situations.

Nothing can be conceived more beautiful to the eye, or more gratifying to the imagination, than the prospect of the rich variety of hill and dale, of rich plantations and fruit-trees or forests, of natural streams and artificial currents, which presents itself to the eye in several of the eastern and middle provinces, at some distance from the coast. In some parts of Kedu, Banyumás, Semárang, Pasúman, and Mulang, it is difficult to say whether the admirer of landscape, or the cultivator of the ground, will be most gratified by the view. The whole country, as seen from mountains of considerable elevation, appears a rich, diversified, and well watered garden, animated with villages, interspersed with the most luxuriant fields, and covered with the freshest verdure.

A list of all the vegetable productions of Java would include the greater portion of those which grow within the tropics in general. Our attention must therefore be chiefly directed to the most remarkable treasures of this highly favoured region.

The mangústin, which on account of its acknowledged pre-eminence amongst Indian fruits, has been termed the pride of these countries; the durian, or duren, to which the natives of the Malayan islands are so passionately attached; the mango, the plantain, the guava, the pine-apple, the papaw, the custard-apple, the pomegranate, the tamarind, and almost every species of tropical fruit are here found in the greatest variety. Innumerable flowers bloom in perpetual succession throughout the year, and impregnate the air with their fragrance: many of them are used by the natives in the ornament of their persons. Many medicinal plants are constantly employed by the natives, a large proportion of which are unknown to Europeans.

From several varieties of palm the natives prepare ropes by pounding and beating the fibre obtained from the large stalks of the leaves. Thread, rope, cloth, &c., are also prepared from the fibrous bark of various kinds of vegetables. The fibrous substance is obtained by beating or macerating the bark, and is then twisted by the hands alone. But the cheapest ropes are made from the stem of a species of bambusa: this stem is split into thin strips, and twisted on the spot into cords fit for all common purposes, although they are serviceable only for a few days. They are constantly used in travelling for securing baggage, &c. Two plants, called widúri and rami, afford strong and durable cords, which are chiefly employed for nets or lines used in fishing. The separate fibres of the pine-apple are employed by the natives in sewing, without any preparation: these fibres are also made into a kind of stuff resembling silk, gauze, &c. Several kinds of grass are worked up into bags, sacks, mats, &c. Paper is manufactured from the *Morus papyrifera*, cultivated for the purpose, and generally called the delúwang, or paper tree.

A variety of vegetable substances used in dyeing are also found here; among these are the *toru*, or indigo, which is extensively cultivated; and the *wong-kudu*, which affords a lasting scarlet. A black dye is obtained from the bark of several exotic trees, united with the rind of the *mangústin* fruit. A yellow dye is also procured from an exotic wood, heightened by the addition of the bark of the *nangka* tree, and a variety of the mango.

Extensive forests of the jábi, or teak of India, are found in most of the eastern provinces; but the most important occur in the central districts. There is much

valuable information connected with the teak-tree, which we reserve for a separate article.

Besides the teak, there are several kinds of wood or timber, employed not only for innumerable domestic purposes, but also in the various native arts, manufactures, and commerce, for those purposes in which Europeans employ metal. There are also several useful trees thus noticed by Raffles:—

The soap tree, of which the fruit is used to a very great extent in washing linen:—the *kasémak*, from the bark of which is made a varnish for umbrellas:—the *sampang*, from the resin of which the natives prepare a shining varnish for the wooden sheaths of krises:—the cotton tree, from which a silky wool is obtained for stuffing pillows and beds:—the wax tree, which, though scarce in Java, grows abundantly on some parts of Madúra: (the kernel by expression, produces an oil, which some time after becomes hard, and bears a resemblance to wax; it may be burnt in lamps or converted into candles, and affords an agreeable odour): the *bendúd*, a shrub producing the substance of which the elastic gum commonly called Indian-rubber, is prepared; the art of preparing it in this form is, however, unknown in Java. Torches are made of it, for the use of those who search for birds' nests in the rocks, and it serves for winding round the stick employed to strike musical instruments, as the gong, &c., to soften the sound. The *minyak káwon*, or niátu, is a very useful tree, which grows solitary in all, and abundantly in some parts of the island, and produces a kind of tallow.

The vine was formerly cultivated in some of the eastern provinces; but an apprehension on the part of the Dutch East India Company that its cultivation here might interfere with the wine trade of the Cape of Good Hope, induced them to discourage it, and the preparation of wine from the grape was strictly prohibited.

The marvellous account of the Upas, or poison tree of Java, which was once received with equal astonishment and credulity, has been proved to be an extravagant forgery. There are two trees in this island from which poison is extracted, viz., the *antjar* and the *chetik*. The former is called *Bopon upas*, or the poisonous tree: it is a high forest tree, from whose outer bark poison is extracted in the form of a milk-white sap. But its exhalations are not poisonous, nor is it, as was formerly supposed, hurtful to surrounding plants: creepers and parasitical plants are found winding in abundance about its trunks and branches.

Among the animals of Java there are no elephants, camels, or asses. The horses are of a small breed, but strong, fleet, and well-made. The buffalo is very common. It is a strong tractable animal, capable of long and continued exertion, but it cannot endure the heat of the mid-day sun. It is shy of Europeans, but submits to the management of the smallest child of the family in which it is domesticated. The cows in Java afford little or no milk beyond what is barely sufficient for the nourishment of the calf. The draught ox, where pasture is good, is a strong active animal. Goats are numerous, and of small size: sheep (called here European goats,) are scarce and small. As in other sultry climates, the sheep have a coarse woollen coat, which is employed for stuffing saddles, pillows, &c., but it is not much valued.

Among beasts of prey there are several species of the tiger, and tiger-cats, the jackal, and several varieties of the wild dog; and among other wild quadrupeds the rhinoceros, the wild Javan ox, the wild hog, and the stag: the last, as well as the rib-faced and axis deer, is tamed and fattened for food. The rhinoceros and the wild hog (the latter especially) are injurious to plantations.

Among birds may be mentioned the peacock, which is very common in large forests, and that interesting bird, the *Hirundo esculenta*, the small swallow which forms the edible nests annually exported in large quantities from Java and the Eastern Islands for the Chinese market. We have already given a short notice of this bird in Vol. XIII., p. 241 of our work, and may here quote the interesting remarks of Raffles on the same subject:

"These birds not only abound among the cliffs and caverns of the south coast of the island, but inhabit the fissures and caverns of several of the mountains and hills in the interior of the country. From every observation which has been made on Java, it has been inferred that the mucilaginous substance of which the nests are formed is not, as has been generally supposed, obtained from the ocean. The birds, it is true, generally inhabit the caverns in the vicinity of the sea, as agreeing best with their habits, and affording them the most convenient retreats for attaching their nests to; but several caverns are found inland, at a distance of forty or fifty miles from the sea, containing nests similar to those on the shore. From many of their retreats along the southern coast, they have been observed to take their flight in an inland direction, towards the pools, lakes, and extensive marshes, covered with stagnant water, as affording them abundance of their food, which consists of flies, musquitos, gnats, and small insects of every description. The sea that washes the foot of the cliffs, where they most abound, is almost always in a state of the most violent agitation, and affords none of those substances which have been supposed to constitute the food of the esculent swallow. Another species of swallow on this island forms a nest, in which grass, or moss, &c., are merely agglutinated by a substance exactly similar to that of which exclusively the edible nests consists. This substance, from whatever part of these regions the nests be derived, is essentially uniform, differing only in the colour, according to the relative age of the nests. It exhibits none of those diversities which might be expected if it were collected casually (like the mud employed by the marten, and the materials commonly employed in nest-making), and applied to the rocks. If it consisted of the substances usually supposed it would be putrescent and diversified.

Dr. Horsfield thinks that it is an animal elaboration, perhaps a kind of secretion: but to determine its nature accurately it should be carefully analysed, the anatomy of the bird should be investigated, and its character and habits watched.

In addition to this information we may state that M. Dobereiner and Mr. Brande have analyzed some of these nests: their experiments do not indicate the substance of these nests to be of animal origin, but to be more allied to the vegetable gums. M. Valenciennes states distinctly that these nests are made of the branches of a certain fucus; and M. Desfontaines, a very expert botanist, arrived at the same conclusion by comparing some of the colourless fucus brought from the Moluccas with the composition of the nests in question. Many of the vegetable productions of the Indian Ocean are edible, and one of them, the *Fucus sacchariferus*, contains a large portion of sugar; and it may probably be found hereafter that these celebrated edible nests are obtained from that particular sea-weed.

Among the feathered tribe the fire pheasant of Java is one of the most deservedly distinguished. It is called the fire pheasant from the circumstance of its having upon the back, just above the tail, a mass of feathers of an ardently luminous colour. In some lights this is so bright as to appear like a flame of fire. The darkest tint about the neck and body is of an intense purple, deepening almost into a Prussian blue. This pervades the neck and back, gradually subsiding towards the tail until it terminates in the flame-coloured feathers just mentioned. The tuft on the head is dark blue, but the colour is less intense than that of the back. About the eyes, which are of a deep scarlet, the feathers assume a tint of pale greenish azure.

The beak is yellow, blended with brown, and the legs are red. From the tail two white feathers branch with a graceful curve, terminating in a black circular spot, like the tail feathers of the peacock. The white streaks upon the body are on a ground of bluish purple, similar in tint to the wings, but not so dark. The bird is about the size of a common dunghill cock. The hen is of a reddish brown, with nothing of splendour in her plumage. Several specimens of this bird have been sent to England, but in all of them the two long tail feathers are wanting, which circumstance has led to a doubt as to their existence in the living bird. The Rev. Mr. Caunter,

however, states that in Java those feathers are so highly valued that the Javanese invariably pluck them from the bird whenever it is obtained, and sell them at a high price. This will at once account for the specimens being sent to Europe without the tail feathers.

The kayman abounds along the shores and in the principal rivers of the island, but according to Raffles, the animal resembles more the crocodile of Egypt, than in that of the Ganges, or the American alligator. In its manners, habits, and destructive qualities, it resembles the largest animals of this genus. Its eggs are eaten by the natives, and the fat is collected for medical purposes. There are various kinds of lizards; two varieties of turtle; the green frog, which is frequently eaten; and several varieties of serpents said to be poisonous; but against the bite of these the natives apply no remedies worthy of notice; charms and superstitious applications are generally resorted to. According to the account of the natives, a small agile serpent frequently ascends trees, and suspending itself by the tail, seizes upon small animals passing below. Fish is abundant. Honey and wax are produced by three species of bees inhabiting the large forests, but they are both collected in very inconsiderable quantities. Silk-worms were once introduced by the Dutch near Batavia, but attention to them did not extend among the natives. The chrysalis of the large atlas affords a coarse silk, which, however, is not collected for use. Many species of insects attack both fruit and corn, sometimes to the destruction of the crops of whole districts. The natives sometimes attempt to extirpate the insects by burning chaff and brimstone in the fields. There are scorpions and centipedes, but their bite is not greatly dreaded: the natives generally apply a cataplasm of onions to the wound.

Few minerals are found in Java. Iron pyrites occur in small quantity in several districts, and indications of gold, silver, and mercury have been observed. Salt is procured by evaporating sea-water at different parts of the northern coast. Saltpetre is extracted from the earth of some caves, and sulphur is procured in the neighbourhood of the volcanoes.

SUMMER NIGHTS IN NORWAY.

At that season, the course of the sun is so oblique to the plane of the horizon, that while he never rises high in the zenith, he also never sinks far beneath view. Unlike, therefore, "the set of tropic sun, who sudden sinks, and all is night," the glorious orb, for some time before and after the summer solstice, remains so few degrees below the horizon, that the refraction of its rays preserves a perpetual twilight: how holier, sweeter far than garish day, and yet how different from our own Midsummer nights, sweet though they be! The light is strong enough to enable one to read or write in the interior of a room: and stars even of the first magnitude are invisible. Yet it is a chastened, mellow light; not casting strong shadows, but throwing a golden mantle of tranquil repose over every object it touches and beautifies. It is impossible to describe the peculiar effect it produces, not only upon the eternal snows of Sneehættan, or, "the pine forest's immemorial shade," or the silvery cataract's ceaseless turmoil; but still more upon a sleeping city, like Trondhjem. The buildings lie so palpably stretched before the eye, yet so harmoniously blended together, their picturesque points heightened, their harsher defects softened down; the vast Fjord expanding distinctly without a wave or ripple to the feet of the distant blue mountains; the boats rocking idly by the shore; the scenes of labour silent as the grave; all the records of Nature and of man so perceptible, yet so still; it needs but to follow the musings of the imagination to fancy oneself alone in a new world, or realizing the conceptions our childhood formed of Fairy-land. However dreamy such fancies may appear to others, not conversant with these latitudes, they pourtray but faintly the emotions I have felt on those lovely Northern nights, which are classed in my memory of memories with the delicious evenings of Naples and Baiæ.—*Two Summers in Norway.*

ON DOUBLE AND MULTIPLE STARS.

In our Supplements relating to Astronomy we briefly alluded to the phenomena of *double stars*, as a department of that beautiful science which could not be wholly overlooked. But we will take the present opportunity of giving a summary of the views and labours of astronomers on this point. The French Academy of Sciences a few years ago awarded a prize to Sir John Herschel, for his discoveries in this extensive field, and M. Arago thereupon traced the progress which had been made therein.

The names of *double*, *triple*, and *quadruple stars*, are given by astronomers to small groups of two, three, or four stars, so evidently connected by some bond of mutual attraction as to be classed together. In the ordinary view which we take of the starry heavens, even when aided by a telescope, the stars seem separated one from another; but observers of first-rate ability have found, by the aid of powerful instruments, that many of these seemingly single stars are really double, being separated into two by a distance so minute as to be inappreciable to other observers. Sir W. Herschel, who was the first to pay steady attention to this subject, classed all the double stars which he discovered under one or other of four heads, according to the angular separation between their component halves; and he thus catalogued more than four hundred double stars, a number which he increased before his death to five hundred. After Herschel, Professor Struve, a distinguished continental astronomer, explored the heavens with a magnificent telescope made by Fraunhofer, and raised the number of double stars to more than three thousand. Struve had examined a hundred and twenty thousand stars, from the 1st to the 8th magnitude; which, therefore, gives one double star to every forty single ones.

The triple and quadruple stars do not appear to be very abundant, perhaps on account of the difficulty of discovering them.

The two component stars of which a double star consists have in general different degrees of brightness, and sometimes even a difference of colour. Often the brighter of the two presents a reddish-yellow colour, while the other presents a greenish-blue tint. About sixty double stars have been enumerated, in which the brighter presents a tint varying from white or light-yellow to red, and the other a tint partaking more or less of blue or green.

The value which astronomers place in this discovery rests partly on the hope that by its means the distance of the stars might be ascertained. Galileo in the seventeenth, and Dr. Long in the eighteenth centuries, both thought that if two stars differing in brilliancy, could be viewed when nearly in a right line, that is, when one nearly obscured the view of the other, means might be furnished for determining their distances; and it is said that the elder Herschel discovered the double stars while seeking to discover among the various constellations two stars sufficiently close together for this purpose: he found many that were extremely close, but he also found that in such cases the brighter of the two seemed to act as a sun or centre, round which the other revolved. The less bright star was sometimes to the east, at others to the west; now above, now below, the brighter one; all which is explicable only on the hypothesis of one revolving round the other. Thus, as often happens in science, a search for one thing afforded another still more important.

The method by which the double stars are viewed is described by Arago thus:—

Two very fine threads must be stretched through the focus of a telescope. The one must pass across the centre of the circular space denominated the "field of vision," and must be immoveably fixed to the tube. The other thread must turn round the same centre, so as to coincide when

necessary with the stationary thread, or to make with it an angle in any direction, right or left; these angles are to be measured upon a graduated circle, connected with the tube. In making an observation, the brighter star is first placed at the intersecting point of the two threads; and the moveable thread is then turned round, till brought accurately over the other star.

It will be seen that this method relates not merely to the detection of the double star, but to the measurement of the apparent angular distance between its component halves; a point of delicacy into which we need not further enter here. Suffice it to say that astronomers indicate the relative positions of the two stars by the angle which a horizontal line passing through the brighter star when in the meridian, bears with the straight line that joins this star to the other. By the aid of a micrometer attached to a telescope, astronomers are able to determine whether the apparent distance between the two stars varies.

The period taken for the revolution of the smaller, or least bright star, round the other is surprisingly great. One in the constellation of the Great Bear takes fifty-eight years, others two hundred, four hundred, and even so far as twelve hundred years: that is, the rate at which the moving star now progresses is such, that twelve hundred years must elapse before a similar rate of motion will complete its circuit. One of the double stars, discovered by Sir W. Herschel in 1782, completed its circuit in 1840, and has now entered on another similar course.

In some cases the *edge* of the orbit of the moving star is towards the earth, so that the only evidence of motion is afforded by the alternate change of position from the right to the left, and from left to right, of the brighter star; while in other cases motion in an elliptical orbit is clearly appreciable. Hence, it arises that in some cases a system known to be double appears single, because the duller star is at the present time exactly between the earth and the brighter star, forming a true eclipse or occultation of the latter.

It has been found, taking the relative brightness of the stars as an index of their size and distance, that the law of attraction, varying as the square of the distance, seems to operate even in those remote portions of the heavens, thus giving a grand extension to the principles of gravitation. This law once being known to operate on double stars, if the distances of these stars from the earth could be determined, then the *masses* of those of the stars whose relative motions are known might be compared with the mass of the earth or sun. Arago goes through a beautiful, but for our pages too complicated, series of reasonings to show how this could be effected if the distances from the earth were known; he shows that astronomers, however astonishing it may appear to others, are able to demonstrate that if the sun could by any possibility be weighed at one end of a balance, there would be required 337,000 terrestrial globes to balance it at the other; and he truly remarks that "of all the results which constitute the glory of modern astronomy, none so much strikes the imagination of those who are not acquainted with the laws of celestial mechanics, as the determination of the masses of the stars;" and that "science, in being enriched with a knowledge of the movements of the double stars, has made an immense stride in the solution of a problem which seems far removed above the intelligence of man. The day in which the distance of a double star shall be determined will be the day in which it may be weighed, in which we shall know how many millions of times it contains more matter than our globe."

The mathematical processes at the command of the astronomer, aided by refined astronomical instruments, have enabled him to make something like an approach to a determination of the distance of the stars, which determination it is expected will be aided by the phenomena of double stars. The approximation to which we allude is expressed in these terms, that the distance of these stars is now known to be *not less* than a certain amount; but how much greater is for future observations to determine. Thus, one particular double star was found thirty years ago to be *not less* than half a million times farther from the earth than the sun is; a distance which, expressed in numbers, would wholly baffle common conceptions; but how much it may be *more* than this, cannot yet be ascertained.

It is supposed by many astronomers, that the difference of colour often observable in the two stars of a binary group is due to the optical principle of *contrast*, by which "accidental colours" are produced. If a brilliant green object be seen on a white ground, the white most contiguous to the green assumes a pink hue; if the object be blue, the accidental colour becomes orange, &c. Now as the blue and green stars are generally the smaller in their respective groups, it is supposed that the more brilliant ruddy light of the larger star produces that blue or green appearance, and that the stars do not really emit a light of the last mentioned kind. In some few cases, however, a bluish secondary star accompanies a brilliant white primary, a combination which cannot be due to contrast; and, therefore, it is supposed that some of these stars really present a blue tinge, independent of the effect of the companion star. There is a remark by Arago on this point, which shadows forth a speculation equally vast and beautiful:—

We must look to time and accurate observations, to inform us if the green and blue stars be not suns which are already in the process of waning; if the different shades of these stars do not indicate that their combustion is proceeding with different degrees of intensity; and, finally, if the tint, with the excess of the most refrangible rays, which the lesser star often exhibits, be not owing to the absorbent power of an atmosphere which the action of the star, usually much more brilliant than that which it accompanies, may develope.

We may remark, in conclusion, that the detection of double stars furnishes one of the best tests for the excellence of a telescope, since nothing less than the most perfect combination of parts in the instrument can make such minute divisions perceptible to the eye.

TALK to a blind man: he knows he wants the sense of sight, and willingly makes the proper allowances. But there are certain internal senses which a man may want, and yet be wholly ignorant that he wants them. It is most unpleasant to converse with such persons on subjects of taste, philosophy, or religion. Of course, there is no *reasoning* with them, for they do not possess the facts on which the reasoning must be grounded. Nothing is possible but a naked dissent, which implies a sort of unsocial contempt, or, what a man of kind dispositions is very likely to fall into, a heartless tacit acquiescence, which borders too nearly on duplicity.—SOUTHEY.

THE Great Turk's dogs, and the manner of keeping them, (says the merchant Sanderson,) are worth the sight, for they have their several attendants as if they were great horses, and have their clothing of cloth of gold, velvet, scarlet, and other colours of cloth; their sundry couches, and the places where they are kept, most cleanly. My Lord Zouch when he was there, as Master Burton said, did like exceedingly well of this place and attendance of the dogs. When the Great Turk went out of the city toward the wars, it was with wonderful great solemnity and notable order, too long to describe particularly: but I remember a great number of dogs led afore him, well manned, and in their best apparel, cloth of gold, velvet, scarlet, and purple cloth.—PURCHAS.

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